Amit Kumar Pathak

https://amitpathak09.github.io

Email : amitkpathak09031997@gmail.com
Mobile : +91-7047588450, +91-9431888031

Education

- **Indian Institute of Technology Kharagpur** — West Bengal, India
  Bachelor of Technology in Civil Engineering; CGPA: 7.35 — *July 2015 – April 2019*
- **Kendriya Vidyalaya Sangathan** — Patna, India
  SSCE, Percentage: 92.4; SSE, CGPA: 10.0 — *2012 – 2014*

Projects

- **Autonomous Hybrid Multi-rotor Aerial Vehicle** — ARK, IIT Kharagpur
  Research Group, ***Prof. Somesh Kumar*** — *October 2017 - Present*
  - Designing a **Hybrid coaxial tri-copter** and **Hybrid tilt-rotor quadcopter** using 3D-printed and CNCed parts to achieve multifolds higher range and flight time as compared to traditional Multi-rotors.
  - Working on modifying PX4 firmware for the hybrid vehicle to achieve multi-rotor as well as fixed wing capability executing smoother tilt transition between the two forms.
  - Finally targeted to achieve **autonomous flight:** takeoff, transition and landing using GPS waypoints.
- **SAR (Search and Rescue) Quadcopter** — HJB Hall
  Hardware Modelling — *October 2017 - Present*
  - Developing a quadcopter system that autonomously navigates and patrols an area using GPS waypoints.
  - Identifies humans from the downward facing camera feed using Deep Learning Techniques and marks it's position with gps coordinate using image transformation and feedback of quadcopter tilt and altitude.
- **Self Balancing Robot** — IEEE Certified Winter Workshop
  Mentor — *December 2016*
  - Made a robot capable of balancing itself on two wheels using **two layered PID control**, getting feedback from **sensor fusion** of gyroscope and accelerometer (MPU6050) with encoder motors.
  - Designed & tested the system for checking robustness, convergence and stability of two leveled pid controller.
- **Auto Omni-drive Corridor following robot** — IEEE Certified Winter Workshop
  Student Member — *December 2015*
  - **Embedded design & autonomous robotics**: Made an autonomous robot that can avoid obstacles and follow a corridor using SoNaR sensors with algorithms for motion using tri-wheeled robot having omni-wheels.
- **Face detection, Colour blob detection** — IEEE Certified Winter Workshop
  Student Member — *December 2016*
  - Learnt Image Processing using **OpenCV** and worked on Face detection using **template matching** and Colour blob detection using **BFS**.

Position of Responsibilities

- **Technology Robotix Society** — IIT Kharagpur
  Head — *March 2017 - Present*
  - Leading a 3-tier team of 35 students as a Head of official robotics society of IIT Kharagpur to conduct national level robotics event in the techno-management fest Kshitij of IIT Kharagpur.
  - Organised multiples workshop in campus as well as throughout India to spread the culture of robotics.
  - Co-developed the manual event Bomb-disposal organised in Robotix-2017 that saw participation of over 450 students. Event head for the manual event Poles-Apart being organised in Robotix-2018.

- **Aerial Robotics Kharagpur (ARK)** — IIT Kharagpur
  Controls Team Member & Finance Head — *February 2016 - Present*
  - Designed hexacopter platform based on Pixhawk2 FC and Odroid XU4 for high level computations with complete sensor stack to participate in the **International Aerial Robotics Competition-2017** held in Beijing winning the **Most Innovative Design award**.
  - Working on development of MAVs for the use in different fields such as Medical Emergency, Agricultural production prediction, Disaster mitigation and autonomous delivery etc.
  - As the Finance Head, responsible for procuring and managing the technical inventory of the research group along with handling all the funds and related finances.

- **Swarm IIT Kharagpur** — IIT Kharagpur
  Embedded Electronics Team Head & Finance Head — *February 2016 - Present*
  - Working on developing a decentralised system of robots that can communicate with each other and navigate in a featureless arena localising itself and other robots meanwhile patrolling the arena efficiently.
  - As the Finance Head, responsible for procuring and managing the technical inventory of the research group along with handling all the funds and related finances.

- **Autonomous Winter Workshop** — IIT Kharagpur
  Mentor, IEEE Certified Workshop — *December 2016*
  - Mentored a group of 40 students in the week long workshop and taught basic embedded electronics, autonomous robotics and basic control systems thereafter achieving targeted Problem Statement.

Relevant Courses

- Programming and Data Structures, Electrical Technology, Basic Electronics, Transform Calculus, Probablity and Statistics.
- **Civil:** Computer graphics and engineering drawing, Solid Mechanics, Structural Analysis.
- **Coursera:** Deep Learning and Neural Networks (Ongoing), Machine Learning, Controls of Mobile Robots.

Technical Skills

- **Languages:** C, C++, Python, MATLAB, Octave, Bash
- **Libraries:** OpenCV, ROS, TensorFlow
- **Softwares:** Ansys, SolidWorks, Atmel Studio, Proteus, Photoshop.
- **Hardware:** AVR, Arduino, Rasberry Pi, Beaglebone Black.

Awards & Achievements

- Won the **Most Innovative Design Award** in IARC-2017 at it's Asia-Pacific venue in Beijing, China.
- **Best Fresher Award** for the Manual Robotics Event: Summit in Kshitij-2016.
- Participated in National Science Exhibition - KVS and won 2nd prize in Regionals.
- Certificate of Excellence - Bihar Science Challenge
- Pratibha Samman - 2012 by Prabhat Khabar

Hobbies & Interests

Robotics - Actively involved in robotics activities around the campus | **Sports and fintess** - Qualified Written, Initial Screening and PABT Test in **NDA-2014**, actively play Volleyball, Table Tennis & Badminton | **Drone Pilot** | **Hiking** | **Debating** | **Writing**